IJIREEICE

ISSN (Online) 2321-2004
ISSN (Print) 2321-5526

International Journal of Innovative Research in
Electrical, Electronics, Instrumentation and Control Engineering

Vol. 8, Issue 05, May 2020

Intelligent Self-Parking Chair

Mrs.S.Y.Upadhye[1], Miss.R.S.Chudappa[2], Miss. S.S.Chavan[3], Miss. R,R.Khanderajure[4], Miss. S,N.Patil[5]

Assistant Professor, Electronics Dept, DKTE's TEI, Ichalkaranji, India[1]

Student, Electronics Dept, DKTE's TEI, Ichalkaranji, India[2,3,4,5]

Abstract: The project describes a system or a product which will reduce the human efforts and save time through the use of radio frequency identification technology. For making this arrangement in a real plan very high technological instruments are required. In this project a prototype of such a model is made. The "intelligent Self-Parking Chair" is a unique chair that automatically moves to a set position. The chair includes a roller to automatically move 360 degree paired with a system that indicates the target position with the help of different sensors and PIC controller, we can be able to detect the unarranged chairs and with the algorithm we can park those chairs to an appropriate location.

Keywords: PIC controller, RFID, motor driver, sensors.

I. INTRODUCTION

Now a days we observe in the main building like offices, labs after completing the meeting people does not arrange their chair to the respected places which consumes more time and human efforts is also wasted, to overcome this problem or we can say to reduce the human efforts and save time we will develop a chair which will work on the basis of self-parking or we can say intelligent parking. This self-parking chair will be the unique solution to the problem of arranging the chair again and again. Considering that, Self-parking chair should be well developed to optimize its benefits to our own living. The aim of this project is to build a prototype of a self-parking model that can move on a flat surface with its two driving wheels and a free wheel.

II. LITERATURE REVIEW

We implemented Smart IoT Chair system for Internet of Things (IoT) that combines an embedded IoT device and a chair with separated seating pads. The proposed Smart IoT Chair records and visualizes user's posture through a smartphone application to help the users correct their unbalanced posture. It uses custom designed sensors for pressure and tilts sensing, and also uses iBeacon and Bluetooth communication to transmit data with low-power consumption. We implemented a prototype of Smart IoT chair combining six custom sensors,PIC, a Bluetooth module and a chair [1].Yokohama, Japan, CEO: (Carlos Ghosn) announced the first "Intelligent Parking Chair", a concept inspired by its intelligent park assist technology that allows drivers to easily park their vehicles using automatic steering. The "Intelligent Parking Chair" is a unique chair that automatically moves to a set position. The chair includes a roller to automatically move 360 degrees paired with a system that indicates the target position. Four cameras placed on with this innovation in office technology, Japanese businessmen are now freed from the troublesome task of arranging chairs, using this new technology already adopted in the X-Trail Hybrid and other Nissan vehicles. The "Intelligent Parking Chair" is inspired by Nissan's "Intelligent Park Assist" technology. The base "Bird's –eye view" and "Automatic Movement" concepts are also introduced in the Intelligent Parking Chair. Conversely, the surprise and comfort earned from this effortless process can be equally seen in the Intelligent Parking Chair. A one of a kind answer for the issue of cleaning up lines of seats after office gatherings a notable Automakers Nissan have built up the innovation. The Japanese firm has concocted self -fuelled office seats that stop there arranged seats themselves over into their stopping position with the sound sensor. This Japanese organization utilized four movement delicate cameras toward the edges of a roof and utilized them to track general office seats on wheels this innovation is otherwise called picture handling.[2]

The Wi-Fi controlled cameras find each seat's area and it takes after the course back to its beginning stage. The room format is pre modified into the framework, with singular seats allocated their own spot at the table. The seats have been customized to react to the sound sensor or the hints of a human applaud, with each seat consequently backpedals to its underlying position. We were really taking a gander at office seats as a theme and seek there is a need after this in some real organization, in their gathering room. "Nissan's definitive objective is self-driving (autos), and the self-stopping part is only one of the procedures en route. More than considering them just furniture, we trust individuals can consider it to be the means by which our innovation can be brought into different articles". Some even said they wished to see it in their own homes like examination room, feasting table and so forth [2] from the innovation and learning behind itself – stopping autos, Nissan planned what it calls the "Intelligent Parking Chair.

IJIREEICE

ISSN (Online) 2321-2004
ISSN (Print) 2321-5526

International Journal of Innovative Research in
Electrical, Electronics, Instrumentation and Control Engineering

Vol. 8, Issue 05, May 2020

III. PROPOSED METHOD

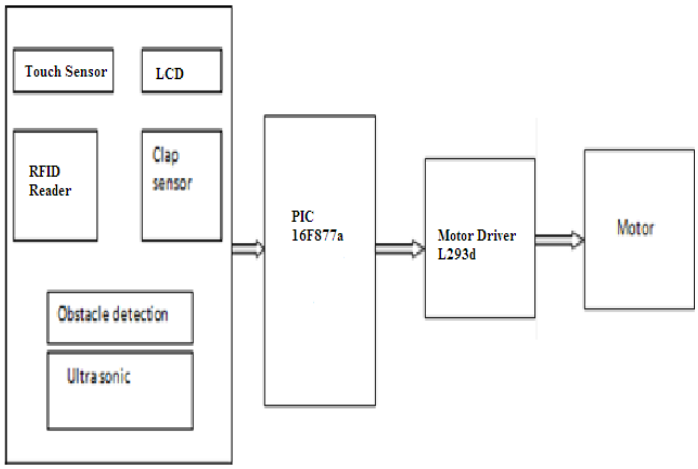

Fig. 1 Block Diagram

As you can see in the block diagram shown in fig.1, Microcontroller is the brain of the project. All components like sound sensor, ultrasonic sensor, touch sensor, LCD display, RFID module & motor driver are connected to the respective port pins of controller. LCD pins connected to port B, port C is interfaced with motor driver l293d, port D is connected to ultrasonic sensor, touch sensor & sound sensor respectively. As per project flow, when sound sensor detect clap sound and there was no presence of person on chair, which was verified by using touch sensor output. Controller gives instruction to motor driver in such way what the chair will move forward until it reaches to its parking position. Parking position is fix with RFID tags for each chair separately. Chair hardware contains RFID reader which will find the exact parking position with detection tag. In case while chair moving towards parking position any obstacle detected to controller. An ultrasonic sensor used to detect obstacle presence in path. Controller again gives instruction to motor driver l293d to control motor in such way that 1st chair stop while distance in between chair and obstacle was less than 10cm. then chair will move back for some delay of few milliseconds, then it move towards left and again move forward until it reaches to parking position. As each RFID tag has its unique identification number each chair will only park to its respective position only.

A. **Localization of Position**

The EM18 module circuit is a trio of sensors and application specific support circuit to measure radio frequency fields. With power supply applied, the sensor converts any incident field into a differential voltage output. The RFID module are made of a copper thin-film and patterned as an inductive strip element. In the presence of a radio filed, a change in the bridge resistive elements causes a corresponding change in voltage across the bridge outputs. One thing needs to be kept in mind that the output of EM-18 reader uses 5V logic level. We could use another microcontroller which uses a lower logic level, but in such cases, the additional logic level converter is required. In few cases, the UART pin of the 3.3V microcontroller is often 5V tolerant. The UART output provides 12-bit ASCII data. First 10 bits are RFID tag number, which is the unique ID and last two digits are used for error testing. Those last two digits are the XOR of the tag number. EM-18 module will read the data from 125 KHz Passive RFID tags or cards. Those tags or IDs have a factory programmed memory array which stores the unique ID number. As those are passive, so no battery is present in the card or tags, they get energized by the magnetic field of the RF Transceiver module. These RFID tags are made using the EM4102 CMOS IC which is clocked by the magnetic field too.

B. **Moment control of DC motor**

A DC motor in simple words is a device that converts electrical energy (direct current system) into mechanical energy. It is of vital importance for the industry today. The maximum output current of microcontroller pin is 15mA at 3.3V. But the power requirements of most of DC motors is out of reach of the microcontroller and even the back EMF (electro motive force) which is produced by the motor may damage the microcontroller. Hence it is not good to interface DC motor directly to the controller. So use motor driver circuit in between of DC motor and controller.

Here, we are using L293D motor driver IC to drive DC motors. Using this IC, we can drive 2 DC motors at a time. For this IC motor supply is variable 4.5 to 36V and it provides maximum current of 600mA.The code part is simple. It is written in c language using MPLAB XID and XC8 compiler. This header file is necessary to be included if you are using XC8 compiler. Then the crystal frequency is defined which is 20 MHz.Then individual pins are defined for each button. In the main function ADCON1=0x06 instruction initializes all pins of port A as digital. This instruction is very

IJIREEICE

ISSN (Online) 2321-2004
ISSN (Print) 2321-5526

International Journal of Innovative Research in
Electrical, Electronics, Instrumentation and Control Engineering

Vol. 8, Issue 05, May 2020

important. Port A of pic16f877 is multiplexed. It can be used as digital I/O as well as Analog input pins. ADCON1 register is used to configure port A to be used as ADC or digital I/O. Loading 0x06 in ADCON1 makes port an all pins as digital I/O. Now after initializing port a pins as digital I/O you need to initialize them as digital input or output. TRISA register is used to initialize them as digital input or output. Loading TRISA=0b11111 will initialize all pins as digital input. TRISC2 register is initializing port c pin 2(CCP1) as output.PR2 register is used to set timer 2 period. I loaded 0xFF in it, which means timer increments up till 255 and then back starts from 0.

IV. RESULTS

A virtual circuit containing PIC 16F877A microcontroller and EM18 RFID and 60rpm dc motors are designed in Proteus in order to simulate and analyze the results. The simulation steps in order to compile the program and write it on the microcontroller. Since there are multiple types of sensors with different specifications in the project, the results obtained from the simulation on Proteus differ in terms of dc motor behavior. The simulation considers the direction of motor with respect to the generated information with the ultrasonic sensor.We can see inbuilt feature of this object detection algorithm. So, using this algorithm we have separated only chairs objects. After that we can judge the location of each and every chair using RFID tags and starts rearranging.

V. APPLICATIONS

1. Widely useful in conference halls, offices, public fields.
2. Can be useful for physically challenged people.
3. Most importantly it can be used in hospitals.
4. It can be used at home and shopping malls also.

VI. CONCLUSION

Recent advancements in the technology are making lives easier for everybody. The proposed work is very modular as it can be easily implemented in future in any type of working environments. Currently the RFID Based Self-Parking Chair is in prototype stage and works with a limited number of sensors and on a limited scale. Thus, the project on the Self-parking mobile chair is successfully implemented in the predefined environment. The future scope of this project on the self-parking mobile robot using RFID can be extended using the GSM, ZIGBEE technologies. Also it can be modified to add more features to suit specific needs or to adjust its cost- benefit ratio. Efforts are also being made to advance from the prototype stage into a more finished and polished product that will be suitable for demonstrations and promotion. The drawback of knowing the unknown environment can be cross over using the above proposed technologies.

REFERENCES

[1]. J. Chinrungrueng, U. Sunantachaikul, and S. Triamlumlerd, “Smart parking: An application of optical wireless sensor network,” in *Proc. SAINTW, Hiroshima, Japan, Jan. 2007*
[2]. http://www.engadget.com/2016/02/15/nissan-intelligent-parking-chair-stunt/
[3]. http://www2.nissan.co.jp/brand/experience/social/ipc1.gif
[4]. http://www2.nissan.co.jp/brand/experience/social/